Tort Reform, Disputes and Belief Formation

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Abstract

We experimentally study the effects of the split-award tort reform, where the state takes a share of the plaintiff's punitive damage award, on litigants' beliefs and bargaining outcomes. In addition, we study the formation of litigants' beliefs in a strategic environment. Our results provide support for coherence-based reasoning theories: coherence shifts in litigants' background beliefs (elicited before a role is assigned and after commitment to a choice at the pretrial bargaining stage) suggest bi-directionality between choices and beliefs. Our findings also suggest role-specific bias in the updating of plaintiffs' beliefs about firm's negligence. Finally, our findings indicate that split-awards affect plaintiffs' beliefs about fairness and lower out-of-court settlement amounts.

KEYWORDS: Tort Reform; Belief Formation; Split-Award Statute; Coherence-Based-Reasoning; Role-Specific Bias; Self-Serving Bias; Motivated Reasoning; Settlement; Litigation; Experiments; Debiasing through Law

JEL Categories: K41, C90, D83, A12

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1 Introduction

Punitive damage awards are primarily intended to punish defendants for their egregious conduct against society and to deter others from engaging in similar conduct in the future (Sloan, 1993).[1] There is a common perception that excessive punitive damage awards[2] have contributed to the escalation of liability insurance premiums and have generated financial burden on firms.[3] This perception has motivated several tort reforms in U.S. states (Sloane, 1993). Some reforms take the form of caps or limits on punitive damage awards while others mandate that a portion of the award be allocated to the plaintiff with the remainder going to the state. These latter reforms, called "split-awards" have been implemented in Alaska, California, Georgia, Illinois, Indiana, Iowa, Missouri, Oregon, and Utah.[4] In addition, New Jersey and Texas have contemplated, but not yet adopted, split-award statutes (White, 2002).

Previous work on split-awards (Daughety and Reinganum, 2003; Landeo and Nikitin, 2006; Landeo et al., 2007a) suggests that this tort reform affects litigation outcomes. These statutes might reduce settlement amounts and increase the likelihood of out-of-court settlement. As a consequence, split-awards might also decrease the firm's expected litigation loss.[5]

Recent findings from social psychology on individual decision-making involving binary choices based on multiple judgments and beliefs (Simon et al., 2001; Simon et al., 2004b)[6] provide evidence on coherence-based reasoning: "[t]hroughout the decision-making process,

[1]The exact words used to describe the standard of proof for punitive damages vary by jurisdiction (Landeo et al., 2007b). In this paper, we use "gross negligence" to represent the punitive damage standard.

[2]Justice O'Connor stated that punitive damage awards had "skyrocketed" more than 30 times in the previous ten years, with an increase in the highest award from $250,000 to $10,000,000 (Browning-Ferris Indus, Inc. v. Kelco Disposal, Inc., 492 U.S. 257, 282, 1989).

[3]See White (2004).

[4]Statutes vary with the state: the base for computation of the state's share can be the gross punitive award or the award net of attorney's fees; the state's share can be 50%, 60% or 75%; the destination of the state's funds can be the Treasury, the Department of Human Services or indigent victims funds. For details, see Dodson (2000), Epstein (1994), Stevens (1994), Sloane (1993).

[5]Note that under split-awards, the plaintiff's award at trial is lower (and hence, plaintiffs are willing to accept lower settlement offers), but the defendant's loss at trial remains the same. The contract zone, defined as the range of settlement values that make both sides better off than not settling, is then larger. As a consequence, the likelihood of out-of-court settlement is higher under this statute. Note also that, given that out-of-court settlement amounts are lower and the likelihood of out-of-court settlement is higher, the firms' expected litigation losses will be lower under split-awards. Finally, note that the firm's level of care and filing of lawsuits have been kept constant in this analysis. See Landeo, et al. (2007b) for an extension of this analysis under endogenous filing and firm's level of care.

[6]See also Simon et al., 2004a; Simon, 2004; Holyoak and Simon (1999).

the mental representation of the considerations undergoes gradual change and ultimately shifts toward a state of coherence with either one of the decision alternatives [...] As the hard case morphs into an easy one, the decision follows easily and confidently. The fact that decisions are ultimately based on skewed models and backed by high levels of confidence facilitates the making of the decision" (Simon, 2004; pp. 513, 517). Coherence-based reasoning theories suggest an alignment between beliefs and choices (even prior to the point of commitment to a decision),[7] and a bi-directional relationship between choices and beliefs.

Given that decision-making involving many choices based on multiple judgments and beliefs is expected to be more complex than decision-making in binary-choice scenarios, we might infer that coherence-based reasoning mechanisms will also be present in multiple-choice environments (i.e., pretrial bargaining environments with a continuum of possible out-of-court settlement choices). If we apply the findings on coherence-based reasoning to the study of split-awards, then we might expect that this tort reform will also affect litigants' beliefs. Note that, under split-awards, lower settlement offers are accepted by the plaintiffs (and offered by the defendants). Given that coherence-based reasoning suggests that choices and beliefs should be aligned, if coherence shifts are driven by *quantitative* differences in out-of-court settlement choices, then we might expect smaller shifts in litigants' beliefs under split-awards. Previous work on split-awards, however, has overlooked the potential indirect effect of this statute on litigants' beliefs. Our research attempts to fill this gap.

Our paper experimentally studies the effects of the split-award tort reform on litigants' beliefs and bargaining outcomes using a complex legal environment, a controlled laboratory setting, and human subjects paid according to their performance. In addition, we study the formation of litigants' beliefs in a strategic environment (i.e., within a pretrial bargaining game between a plaintiff and a defendant and a continuum of possible out-of-court settlement choices). To the best of our knowledge, no experimental test has been previously conducted to assess coherence-based reasoning in strategic settings with multiple choices,[8] or to explore the interaction between public policy and coherence-based reasoning. Given that field data on pretrial bargaining processes are not available or are incomplete (Daughety, 2000), and belief formation is virtually impossible to be observed in real-world settings, conducting an experiment seems to be a valuable alternative.

[7]Note that, in contrast to the cognitive dissonance view (Festinger, 1957), in which shifts serve only as post hoc rationalizations for decisions driven by other factors or different mechanisms (i.e., attitudes and preferences change due to post-decision regret), coherence-based reasoning theories suggest that shifts might occur prior to the commitment to a decision as a means of facilitating complex decision-making processes (Simon et al., 2001).

[8]Simon et al. (2004b) assess coherence-based reasoning in *individual binary choices* using a complex legal case and internet-based experiments.

The experiment encompasses a 2 (statute) X 2 (role), between-subject design. The statutes are split-awards (where the plaintiff receives 25% of the court award) and no split-awards (where the plaintiff receives 100% of the court award). The roles are plaintiff and defendant.

We explore the formation of beliefs at a within-statute level (within-subject analysis), and the effects of split-awards on litigants' beliefs and bargaining outcomes at a between-statute level (between-subject analysis). First, at a within-statute level, we elicit subjects' beliefs and ask subjects to play a pretrial bargaining game. We assess coherence-based reasoning by analyzing bi-directionality between pretrial bargaining choices and background beliefs.[9] Specifically, we evaluate whether the posterior background beliefs (elicited after a choice is made) differ from the prior background beliefs (elicited before a role is assigned and the information about the legal case is provided). We also assess whether these shifts reflect an alignment between posterior background beliefs and litigants' choices at the pretrial bargaining stage. Second, at a between-statute level, we assess whether split-awards affect litigants' shifts in background beliefs, the after-role beliefs about firm's negligence, and the beliefs about fairness. In addition, we explore whether split-awards affect the likelihood of out-of-court settlement and the settlement amount (i.e., whether litigants observe a strategic behavior at the pretrial bargaining stage.)

Our findings are as follows. First, our results provide support for coherence-based-reasoning theories on the formation of beliefs. Indeed, significant shifts in background beliefs, aligned to the litigants' choices at the pretrial bargaining stage, suggest bi-directionality between choices and background beliefs. Second, our findings suggest that litigants form their post-role beliefs about firm's negligence in a role-specific way. Given the alignment of these beliefs with the not-yet-committed choices at the pretrial bargaining stage, these findings also provide some evidence on coherence-based reasoning. Third, our results indicate that split-awards significantly affect plaintiffs' beliefs about fairness. In addition, split-award statutes significantly lower out-of-court settlement amounts.

Previous literature on split-awards suggests that this tort reform reduces settlement amounts and the likelihood of trial (see Daughety and Reinganum, 2003; Landeo and Nikitin, 2006; and, Landeo et al., 2007a). We complement this literature by exploring the effects of split-awards on litigants' beliefs. A second branch of relevant literature studies coherence-based reasoning in binary choices at an individual decision-making level (Simon et al., 2004b,

[9]Background beliefs refer to the subjects' beliefs about behavior of firms in the marketplace (such as firms' concerns about safety, firms' concerns about service quality), negligence of firms involved in product liability lawsuits, credibility of witnesses in lawsuit cases, among others. See the appendices for details. The appendices are available at http://www.arts.ualberta.ca/econweb/landeo/.

2001; and Holyoak and Simon, 1999). Our analysis extends this work (i) by studying the formation of beliefs in a strategic setting (i.e., litigants' decision-making within a pretrial bargaining game and a continuum of possible out-of-court settlement choices), and (ii) by assessing the interaction between belief formation and tort reform (i.e., by studying the effects of split-awards on belief formation).

A third branch of related literature focuses on self-serving bias in bargaining settings. Babcock et al. (1997, 1996, 1995a, 1995b) and Loewenstein et al. (1993) explore the effect of self-serving bias on pretrial bargaining outcomes. Babcock and Pogarsky (1999) assess the effects of damage caps on self-serving bias in predicted trial awards, and on settlement rates.[10] Their findings suggest that litigants' assessment of fairness and their predicted trial outcomes determine their pretrial bargaining choices (i.e., beliefs influence choices) and that caps encourage settlement and reduce the magnitude of the self-serving bias. We extend previous work on self-serving bias (i) by studying the effects of the role assigned at the bargaining stage on litigants' beliefs about the defendant's negligence, (ii) by studying bi-directionality between choices and background beliefs (i.e., whether choices at the pretrial bargaining stage affect background beliefs), and (iii) by analyzing the effects of the split-award tort reform on the formation of litigants' beliefs about fairness and background beliefs.

Several implications are derived from our study. First, our findings on the effects of split-awards on plaintiff's beliefs about fairness suggest that this tort reform might operate as a *debiasing through law* mechanism.[11] Hence, split-award statutes might enhance efficiency on *current* bargaining processes. Second, our findings regarding belief formation indicate that legal processes (such as pretrial bargaining negotiations) might operate as *biasing through law* mechanisms. It can be argued that if recurring coherence shifts leave a strong imprint, then, repeated shifts in background beliefs might operate as a form of learning (Simon, 2004). Hence, legal processes might distort *future* choices of individuals. Finally, the evidence provided by our study about bi-directionality between choices and background beliefs in strategic settings might motivate theorists to construct dynamic economic models of strategic interaction under coherence-based reasoning.[12]

[10]Self-serving bias is defined here as the litigants' difference in predicted trial awards. Hence, a within-subject analysis of the effects of caps on the formation of litigants' beliefs is not performed.

[11]In addition, consistent with Babcock and Pogarsky's (1999) findings on the effects of caps on self-serving bias, our results also suggest that split-awards reduce litigants' self-serving bias in the offers made at the pretrial bargaining stage (defined as the difference between the offers made by plaintiffs and defendants). This result provides additional support to the claim that split-award statutes might operate as debiasing mechanisms. See the seminal paper on *debiasing through law* by Jolls and Sunstein (2006).

[12]Another branch on the literature has studied preferences over beliefs. Some economic models have incorporated preferences over beliefs on single-agent decision games (see Yariv, 2005; and, Bracha, 2004). A

The rest of the paper is organized as follows. Section 2 outlines the qualitative hypotheses. Section 3 describes the experimental design. Section 4 examines the results from the experimental sessions. Section 5 concludes the paper.

2 Qualitative Hypotheses

We use the following concepts in the formulation of hypotheses. First, we define background beliefs as those beliefs that subjects exhibit about the behavior of firms in the marketplace (such as beliefs about firms' concerns about safety, firms' concerns about service quality), negligence of firms involved in product liability lawsuits, credibility of witnesses in lawsuit cases, among others.[13] Background beliefs are elicited in two moments: *prior* background beliefs are elicited before a role is assigned and before the information about the case is provided; and, *posterior* background beliefs are elicited after the pretrial bargaining game is conducted. A *shift* in background beliefs is defined as the difference between posterior and prior background beliefs (i.e., posterior minus prior beliefs). Second, we define the plaintiff's reservation value as the minimum acceptable out-of-court settlement proposal, and the defendant's reservation value as the maximum acceptable out-of-court settlement offer. Third, we define plaintiff's aspiration as the amount that he would like to receive, and defendant's aspiration as the amount she would like to offer.[14]

The qualitative hypotheses to be tested in our experiment are as follows.

Research on self-serving bias (Babcock et al., 1995a; Babcock et al., 1995b; Babcock and Loewenstein, 1997) indicates that settlement proposals exhibit role-specific biases (i.e., plaintiffs' settlement requests will be higher than defendants' offers). These biases might be consistent with motivated reasoning (Kunda, 1990, 1987).[15] Coherence-based reasoning theories suggest *bi-directionality between background beliefs and the choices made on the*

recent paper by Eliaz and Schotter (2006) provides experimental evidence suggesting that individuals derive an intrinsic benefit from their posterior beliefs.

[13]These beliefs do not refer to the behavior of any specific firm or any specific person. See the appendices for details.

[14]Following Kray et al. (2001), we assess the litigants' aspirations by analyzing their first out-of-court settlement proposals.

[15]As stated by Kunda (1990), "[p]eople rely on cognitive processes and representations to arrive at their desired conclusions, but motivation plays a role in determining which of these will be used on a given occasion." Motivated reasoning can be then understood as people's propensity to reason (by effectively attending only to some of the available information) in a way that supports their subjectively favored propositions. Kunda (1987) suggests that "self-serving biases are best explaining as resulting from cognitive processes guided by motivation because they do not occur in the absence of motivational pressures" (p. 636).

basis of those beliefs. Then, the choices at the pretrial bargaining stage might affect the posterior background beliefs. Specifically, litigants might adjust their background beliefs in a self-serving manner, i.e., they might increase (decrease) their beliefs about the likelihood of issues that strengthen (weaken) their case. Hence, we might expect that the litigants' posterior background beliefs will differ from their prior background beliefs, and that the shifts in background beliefs will exhibit role-specific patterns. Given that background beliefs "[are embedded in larger knowledge systems and attitudinal structures" (Simon, et al., 2004; p. 833), it is expected that those beliefs would be more resistant to change (than the evaluation of legal evidence, for instance). Hence, shifts might be more likely to occur in case of background beliefs perceived by the litigant as more relevant to her legal case (i.e., issues that might strengthen or weaken the litigant's case).

Hypothesis 1. Under both split-award institutions, posterior background beliefs will be different from prior background beliefs, for plaintiffs and defendants. Shifts in background beliefs will follow a role-specific pattern.

As mentioned before, research on self-serving bias suggests that plaintiffs' settlement requests will be higher than defendants' offers. Coherence-based reasoning studies (Simon et al, 2001) suggest that *beliefs are aligned to the not-yet-committed choices made under those beliefs.* Then, although the posterior beliefs about firm's negligence are elicited before the litigants commit to their choices at the pretrial bargaining stage, we might expect to observe higher after-role beliefs about firm's negligence on subjects who play the role of plaintiff. Note that, given that both litigants receive the same information about the legal case, this updating of beliefs will represent a violation of Bayes' rule.

Hypothesis 2. Under both split-award institutions, the plaintiff's after-role beliefs about firm's negligence will be higher than the defendant's after-role beliefs about firm's negligence.

Split-awards reduce the plaintiff's share of the court award. Then, split-awards might induce plaintiffs to accept lower out-of-court settlement amounts. The strategic defendants, anticipating the plaintiffs' behavior, will make lower settlement offers. Assuming that coherence shifts are driven by quantitative differences in out-of-court settlement choices, we might expect smaller shifts in litigants' background beliefs under split-awards. Otherwise, we might observe no effect of split-awards on litigants' beliefs.

Hypothesis 3. If coherence shifts are driven by quantitative differences in out-of-court settlement choices, then shifts in litigants' background beliefs under the split-award institution will be smaller than those shifts under the no split-award institution.

As mentioned above, split-awards reduce the plaintiff's share of the court award. Then, plaintiffs will be more willing to accept lower out-of-court settlement proposals, i.e., split-awards will lower their reservation values. As a consequence, plaintiffs will make lower settlement demands, i.e., split-awards will lower plaintiff's aspiration. The strategic defendant, anticipating the behavior of the plaintiff, will make lower settlement offers. Hence, split-awards will decrease defendant's aspiration. Note, however, that given that the defendant's expected loss at trial is not affected by split-awards, the defendant's reservation value will not be affected by this statute.

Hypothesis 4. Split-awards will decrease plaintiff's reservation value but they will not affect defendant's reservation value; and, split-awards will decrease plaintiff's aspiration and defendant's aspiration.

Note first that beliefs about fairness are important components in explaining litigants' choices at the pretrial bargaining stage (see Babcock and Pogarsky, 1999). Then, by coherence-based reasoning theories (Simon, 2004; and. Simon et al., 2004a, b), we might expect that beliefs about fairness and choices at the pretrial bargaining stage should be aligned. Second, note that split-awards lower plaintiffs' settlement demands and defendants' settlement offers (see Landeo et al., 2007a.) Given that beliefs and choices made on the basis of those beliefs should be aligned, we might also expect that split-awards will reduce the out-of-court settlement amounts considered fair by the litigants.

Hypothesis 5. Split-awards will reduce the out-of-court settlement amounts considered fair by the litigants.

In addition to explore these hypotheses, our study extends Babcock and Pogarsky's (1999) research on self-serving bias and damage caps *to the study of the split-award statute*. Our work also extends Landeo et al.'s (2007a) work on split-awards under a free-context environment *to the study of split-awards under a complex legal setting*. The expected results from these extensions are as follows: (i) due to role-specific biases, the plaintiff's estimated court award, reservation value, aspiration, and beliefs about fairness will be significantly higher than the defendant's estimated values and beliefs; and, (ii) split-awards will decrease the out-of-court settlement amount, increase the settlement rate, and reduce the defendant's expected loss from legal action and the plaintiff's net compensation.[16]

[16]These last results can be explained as follows. Under split-awards, the plaintiff's award at trial is lower but the defendant's loss at trial remains constant. Plaintiffs will be then more willing to accept lower settlement offers. The strategic defendants, anticipating this will make lower settlement offers, which will

[INSERT TABLE 1 HERE]

Table 1 summarizes the expected results.

3 Experimental Design

In assessing the validity of the qualitative hypotheses, our experimental study analyzes belief formation and the effects of the split-award institution on litigants' beliefs and bargaining outcomes using a 2 (statute) X 2(role), between-subject design. The statutes are split-awards (where the plaintiff receives 25% of the court award) and no split-awards (where the plaintiff receives 100% of the court award). The roles are plaintiff and defendant. We use a controlled laboratory setting, human subjects paid according to their performance, and a full-context legal environment.

We have specified the experimental setting in such a way that resembles real-life decision making. Although our experiment cannot predict the effects of the split-award institution in richer environments, the experiment can provide a reasonable amount of evidence regarding whether this tort reform in an environment as the one we have structured here will have the predicted effects.[17]

Procedural regularity was accomplished by developing a software program that permitted us to administer the experiment instruments by using networked personal computers.

3.1 The Design

We applied three instruments to perform the within-treatment analysis of belief formation and bi-directionality between choices and background beliefs.[18]

Note that Simon et al. (2004b) assess coherence-based reasoning in individual decision-making with binary choices, using a complex legal case and internet-based experiments. In

be more frequently accepted by plaintiffs. Then, the out-of-court settlement amount and likelihood of out-of-court settlement are higher under split-awards. As a result, plaintiff's net compensation and defendant's expected loss from legal action will be lower under split-awards.

[17]Note that in real-world settings, litigants' attorneys also participate in pretrial bargaining processes. Note also that the participation of attorneys might introduce agency problems and might affect bargaining outcomes. This paper focuses on the behavior of plaintiffs and defendants in pretrial bargaining negotiations. Hence, the analysis of the behavior of attorneys, the effects of their participation in the bargaining processes, and the agency problems between attorneys and clients are not considered here. See Babcock and Pogarsky (1999) and Landeo et al. (2007a) for a similar approach.

[18]See the appendices for a sample of software screens and written instructions for the plaintiff under the split-award condition. A complete set of software screens and written instructions is available from the author upon request.

their experiments, they analyze coherence shifts in the assessment of legal evidence and shifts in background beliefs.[19] Note that, in contrast to Simon et al.'s (2004b) environment, our setting involves not only the elicitation of subjects' beliefs but also the participation of subjects in a pretrial bargaining game with a continuum of out-of-court settlement choices. Note also that the assessment of shifts in background beliefs represents a stronger test of coherence-based reasoning (than the assessment of shifts in the evaluation of legal evidence). Background beliefs are embedded in larger knowledge and attitudinal structures. Then, it might be expected that those beliefs would be more resistant to coherence shifts than the evaluation of legal evidence directly related to the case (Simon et al., 2004b). Finally note that, in contrast to shifts in the assessment of legal evidence, shifts in background beliefs might affect future decisions in legal and non-legal settings. Given the complexity of our experimental environment, we decided to focus on assessing coherence shifts in background beliefs only.

The three instruments related to the within-subject analysis of belief formation are as follows.

Elicitation of Prior Background Beliefs

The first instrument was administered before the role was assigned and before the information about the legal case was provided. We presented subjects with a group of 13 general arguments, that we called "social issues," and requested subjects' personal opinions about them. The purpose of this instrument was to elicit the subjects' prior background beliefs.

[INSERT TABLE 2 HERE]

Table 2 summarizes the thirteen arguments related to the background beliefs. These arguments referred to the behavior of firms in the marketplace (such as firms' concerns about safety, firms' concerns about service quality), negligence of firms involved in product liability

[19] In their experimental environment, subjects were asked first to evaluate pieces of evidence (facts) and background knowledge in isolated vignettes. Second, subjects were presented with information about a complex legal case, asked to choose a verdict (defendant's guilt or innocence), and again respond to the belief and evidence questions in the context of a legal case. For some experiments, the second part of this benchmark environment was modified to assess the effect of role (assignment to a side) on coherence shifts. Subjects were assigned to the role of legal interns whose job was to help a judge draft the supporting arguments for a verdict at which the judge had already arrived. Two roles were included in this setting: the role of an intern assigned to help write an opinion supporting the defendant's guilt; and, the role of an intern assigned to help write an opinion supporting the defendant's innocence. After learning their roles, subjects were presented with the information about the case, and asked to give their own verdict, and respond to belief and fact questions.

lawsuits,[20] credibility of witnesses in lawsuit cases, among others (see Appendices for details.) Note that these arguments were related to facts included in the legal case that motivated the next parts of the experiment (some of these arguments favored the defendant's case and some others favored the plaintiff's case).[21] However, the arguments were not presented as a part of a tort case but as separate statements. Subjects were instructed to evaluate each argument separately, and to choose and type the option (from a five-option scale) that reflected more closely their personal opinion.[22]

Elicitation of After-Role Beliefs about Firm's Negligence, Beliefs about Fairness and Pretrial Bargaining Choices

The second instrument[23] was administered after a role was assigned.[24] It had the purpose of eliciting after-role beliefs about firm's negligence, beliefs about fairness, and assessing decision making under ambiguity in a strategic pretrial bargaining setting. Subjects were first randomly assigned the role of plaintiff or defendant, and then provided with material on a tort case.[25] The legal case encompassed the arguments used in the first instrument, but

[20]Given that we did not require subjects' previous knowledge of legal terms, we referred to product liability situations using simple words.

[21]Only the argument referred to fairness of court decisions in product liability lawsuits was not included in the legal case information. See Table 2.

[22]This five-option scale consisted of the following 5 possible percentage values: 0%, 25%, 50%, 75%, and 100%. To help subjects think in terms of percentages, we assigned a label to each choice: none, the minority, half, the majority, all. For instance, one argument was as follows: "For ... % of companies, the safety of their product is a priority in their business decisions."

In previous pilot studies, we used an eleven-option scale and asked subjects to answer the questions by clicking in the chosen option. We found, however, that the reduction of the possible options from 11 to 5 options and the request to type the chosen option (instead of choosing it by clicking in the option), i.e., the more active participation of subjects, improved subjects' understanding of the task and subjects' concentration. Note that the elicitation of prior beliefs about firms' negligence also followed this method.

[23]This instrument follows Babcock and Pogarsky's (1999) design.

[24]Between the first instrument and the second instrument (related to the bargaining stage), we apply an analogy questionnaire as a "distractor task," to minimize the effects of the previous tasks on the decision making process of the players at the bargaining stage.

[25]Given the purpose of this study, we motivated the bargaining stage to the subjects using a rich litigation context. Research on cognitive psychology indicates that subjects may seem like zero intelligence agents when they are placed in the unfamiliar and abstract context of an experiment, even if they function quite adequately in familiar settings. In these cases, subjects will apply their own labels (Loewenstein, 1999). Also a study conducted by experimental economists (Cooper and Kagel, 2003) reports compelling evidence for the existence of context effects.

We elicited self-serving biases and coherence-based reasoning by using a detailed legal case. Its facts involved ambiguity about the degree of gross negligence of the defendant, and hence, complex decision-

now presented in a more specific form and as components of a tort case. The dispute was based on the damaged suffered by the plaintiff and the possible grossly negligent behavior of the defendant.[26] The plaintiff filed a punitive damages lawsuit for $\$1,000,000$ against the defendant. Subjects were informed that they would have the opportunity to negotiate an out-of-court settlement agreement and that in case of disagreement, legal costs would be deducted from both subjects and the court would decide whether to award punitive damages to the plaintiff. Subjects were also informed that their partners and the court had received the same information, and that a judge would use these facts to assess the degree of gross negligence of the defendant in case of trial. Subjects were not informed what the court award would be.

This second instrument encompassed two parts. The first part consisted of asking subjects to state their estimated probability about the negligence of the defendant (after-role beliefs about firm's negligence),[27] their estimate of the award in case of trial, their reservation values,[28] and their beliefs about fairness (i.e., the most fair amount that a plaintiff should receive as an out-of-court settlement).

The second part of this second instrument consisted of asking subjects to participate in a pretrial bargaining game. Two players, the defendant and the plaintiff, participated

making processes. The fourteen-page case material included three pages of narrative and eleven pages of excerpts from the deposition testimony of several witnesses. The legal case used in this study is a modified version of the case used by Babcock and Pogarsky (1999). We thank Linda Babcock for providing the material.

[26]Note that because split awards apply only to punitive damages, the legal case used in this study referred to a lawsuit seeking punitive damages, where the decision of the court depended only on the assessment of the defendant's gross negligence. The concept of gross negligence that the judge would use in court was presented aloud and explained in detail to the subjects. Note that, we explicitly decided not to define the standard of proof in terms of a specific level of defendant's negligence to resemble real-life settings (see Landeo et al., 2007b, for a discussion of the ambiguity of guidelines for awarding punitive damages in real-world settings; see also Cooter and Ulen, 2004).

[27]Note that the use of a 5-option scale (similar to the one used to elicit background beliefs) could increase the effects of the previous tasks on the decision making process of the players at the bargaining stage. Hence, we decided to use an open-answer format in this question. Subjects could respond to this question by using any percentage number between 0 and 100%. We were aware about the shortcoming of this choice: we could not run statistical tests comparing prior background beliefs about firms' negligence and after-role beliefs because prior beliefs should be treated as discrete variables with ordinal information and after-role beliefs should be treated as continuous variables.

Subjects were also asked to assess the level of confidence on their estimations on the negligence of the defendant (by choosing a number between 1 and 5).

[28]In case of plaintiffs, the reservation value corresponded to the minimum amount they would accept as an out of court settlement; and, in case of defendants, the reservation value corresponded to the maximum amount they would offer as an out of court settlement.

in a bargaining game. At the beginning of the bargaining stage, every participant in the experiment was randomly and anonymously paired with another participant. Each player was equally likely to be paired with any other and the identity of the other person was never revealed to the players. The bargaining game involved at most 4 five-minute pretrial negotiation periods. During each five minute pretrial bargaining period, subjects could interact with each other. Communication between players was done through a computer terminal, and therefore, players were completely anonymous to one another.[29] Once the five-minute period was over, subjects were required to submit an offer/demand. If the offer and demand overlapped (i.e., if the demand from the plaintiff was equal or lower than the offer from the defendant), subjects settled at the midpoint. Otherwise, they went to the next bargaining period and $10,000 was charged to both players. If the pair did not reach agreement after the fourth bargaining period, the court required the defendant to compensate the plaintiff. Delays in agreement and trial were costly in that they required both plaintiff and defendant to expend resources. In addition, under the split-award condition, trial implied that the plaintiff would receive only 25 percent of the award.

Elicitation of Posterior Background Beliefs

The third instrument consisted on presenting subjects with the same arguments used in the first instrument (identical questions presented in different order; see Table 2), and asked them to perform the same tasks required in the first instrument. This instrument had the purpose of eliciting subjects' background beliefs after the pretrial bargaining choices were made (i.e., posterior background beliefs). Hence, this instrument permitted to assess the bi-directional relationship between choices at the bargaining stage and background beliefs.[30]

[INSERT FIGURE 1 HERE]

Figure 1 shows the sequence of events in the experiment.

3.2 The Sessions

We ran 7 150-minute sessions of 8 to 18 subjects each (106 subjects in total) at the experimental laboratory of the University of Alberta School of Business.[31] The subject pool

[29]Subjects used an instant-messenger device (a component of the software designed for this experiment) to communicate with their partners.

[30]Note that the first instrument (elicitation of prior background beliefs) and the third instrument (elicitation of posterior background beliefs) were separated by 90 minutes approximately (distractor tasks and tasks related to the second instrument).

[31]In addition, several pilot sessions were conducted during the first stages of the experimental design.

was recruited mostly by posting advertisements on public boards and on electronic bulletin boards. The pool of subjects included graduate and undergraduate students, from a wide variety of fields of study.

At the beginning of the session, instructions about the software used in the first part of the experimental session (i.e., related to the first instrument) were presented aloud by the experimenter to create common knowledge. After the first instrument was administered, and subjects were informed of their role, written instructions about the bargaining stage and the legal case material were distributed to the subjects. Then, additional instruction about the software used in the bargaining stage and the structure of the bargaining stage were presented aloud. Subjects had 30 minutes to read the case material. To ensure subjects' understanding of the structure of the bargaining stage, a questionnaire consisting of 11 exercises was administered.[32] Finally, subjects started the bargaining stage.[33] After this stage was over, the last instrument was administered.

Subjects were informed about the random process of allocating roles and about the randomness and anonymity of the process of forming pairs. Information about tasks to be performed, bargaining stage structure, and payoff computation was common knowledge among subjects. Subjects were informed only about the game version they were assigned to play.[34] Subjects were also instructed that they would receive their payment in cash at the end of the experiment.

We used "dollars" as the laboratory currency. Subjects received a flat fee for their participation and were paid additional amounts (game payoff) depending on their decision and those of other subjects. The game payoffs, for subjects assigned to the role of plaintiffs, were computed as follows. For a specific session, the subjects with the best performance in the group of plaintiffs received the highest payoff, equal to \$35, plus \$5 participation fee. The other subjects, who participated in that session and were assigned the role of plaintiffs,

[32]The experimenter examined the individual answers to each exercise and pointed out the wrong answers. Time was provided to the subjects to revise the wrong answers. Finally, the experimenter read aloud the right answers to each exercise, and proceeded to the next stage of the experiment.

[33]We decided to use a one-shot game because the analysis of how people learn in highly repetitive situations (learning in games) was not the focus of this study. We were interested in the predictive power of the theoretical model on the effects of the split-award tort reform in real-world settings, where stationary replications are almost impossible, and therefore, the type of learning studied in the laboratory under stationary repetitions is not present (see Camerer (1996) and Loewenstein (1999).

[34]Given that we needed to explain the payoff structure in detail and aloud and given that the payoff structure in case of trial was different for each condition, we ran only 1 version of the game per session. However, internal validity was preserved by random assignment of subjects to conditions, and similar populations of subjects were used in both conditions. Finally, independence of observations was guaranteed by the one-shot game characteristic of the experiment.

received a payoff according to their relative performance with respect to the best plaintiff. Similar procedure was applied to the group of defendants (see Babcock and Pogarsky, 1999, for a previous application of this method).[35] We decided to use this method to avoid introducing noise into the findings due to differences across subjects in their assessment of an initial dollar endowment. In addition, we considered that the use of a specific conversion rate dollars/experimental dollars would reduce the real-life impact of the experimental setting.[36]

The participation fee was CA $5 and the average game payoff per session was CA$21.[37] At the end of each experimental session, subjects received their monetary payoffs in cash.

4 Results

The main findings will be presented in a series of results.

Prior and Posterior Background Beliefs

[INSERT TABLE 3 HERE]

Table 3 reports the within-subject analysis of belief formation, and the between-subject analysis of the effect of the split-award institution on shifts in background beliefs. Thirteen arguments on background beliefs were assessed in our study (see Table 2). We report only the arguments for which prior and posterior background beliefs exhibit significant differences.

[35] In Babcock and Pogarsky (1999), The subjects were students enrolled in a negotiations course. Their game payoffs were expressed in terms of grades, and the grades were determined as follows. "[D]efendant subjects were graded according to how much they obtained relative to other [...] defendants. Lower amounts meant higher grades" (p. 361). Similar procedure was applied to the plaintiffs. Babcock et al. (1995), on the other hand, determined individual payoffs as follows. Before the pretrial negotiation, "[T]he defendant was given $10 from which to make this payment. Every $10,000 for the case was equivalent to $1 for the subjects" (p. 1339).

[36] Note that this method might induce subjects to take variance-increasing actions in order to "get ahead." Given the random allocation of subjects to roles and conditions, we might expect, however, that our qualitative results will still hold. We were also aware that this method could generate incentives on subjects to influence other subjects (assigned to the same role) to play similarly. In this way, all players would be situated at the same level (rank), and hence, all players would get the highest possible payoff. Note, however, that our one-shot game design precludes the influence that a subject could have on another participant assigned to the same role through his partners. In a repeated-game, the partners of the subject who wants to influence the game will later be partners of other subjects assigned to the role of the player who wants to influence the game.

[37] The average payoffs per session were CA$19 and CA$22, for defendants and plaintiffs, respectively.

A decrease (increase) in the litigant's reported percentage on an argument that weaken (strengthen) his case will reflect a coherence shift.

The first three columns refer to the split-award institution, and the next three columns refer to the no split-award statute. For each split-award institution, the table provides information about prior and posterior background beliefs, and the p-values related to comparisons between prior and posterior beliefs (within-subject analysis). Finally, the last column of the table reports the p-values related to the comparisons between shifts in background beliefs (posterior minus prior beliefs) under the split-award institution and shifts under the no split-award statute (between-subject analysis). Note that, the first three rows present information on plaintiffs, and the last three rows report information on defendants.

In case of plaintiffs, the three arguments that exhibited significant differences between prior and posterior background beliefs are as follows: negligence of firms involved in product liability lawsuits,[38] religious people's concerns about safety of others, and unreliability of witnesses' testimonies against people they don't like. The first argument is related to the plaintiff's likelihood of succeeding at trial; the second argument is related to the testimony of the defendant, who claimed that his religious beliefs precluded him to damage others;[39] and, the third argument is related to the testimony of a defendant's witness, Mr. Densler (a former colleague of the plaintiff, who did not like him).[40] In case of defendants, the three arguments that exhibited significant differences between prior and posterior background beliefs are as follows: inflated lawsuit claims, unreliability of public officers' testimonies in favor of people they like, and unreliability of witnesses' testimonies against people they don' like. The first argument is related to the testimony of a defendant's witness, Mr. Densler;[41] the second argument is closely related to the testimony of a defendant's witness, Mr. Olsen (a public officer and close friend of the defendant);[42] the third argument is common to both plaintiffs

[38]Note that, for the case of defendants, prior and posterior background beliefs about firms' negligence did not exhibit significant differences.

[39]The defendant stated, "my strong religious beliefs will never allow me to jeopardize the safety of another human being!"

[40]Mr. Densler, a defendant's witness, when questioned by the plaintiff's attorney stated, "[The plaintiff and I are not friends] anymore. But [...] I am saying the truth. [The plaintiff] believed that it was okay to try to milk companies in court."

[41]Cyrus Densler, a defendant's witness stated that the plaintiff said, "God forbid I get injured. But once I get a lawsuit going, I will inflate my claim."

[42]Mr. Olsen, a granting inspector for the Construction Department, when questioned by the plaintiff's attorney stated, "Yes, [the defendant and I are closed friends], but [...] my testimony or the results of my inspections [...] do not have anything to do with that. Public officers can be trusted even when they act on matters that concern their close friends."

and defendants[43]

Under both split-award institution, for plaintiffs and defendants, we observe coherence shifts in the litigants' background beliefs (except for shifts of beliefs regarding the common argument, in case of defendants). Consistent with Simon et al.'s (2004b), our results suggest an alignment of litigants' background beliefs and their choices at the pretrial bargaining stage. Our findings provide support for Hypothesis 1. These results also suggest that legal processes (pretrial bargaining negotiations) might operate as *biasing through law* mechanisms, and affect *future* decisions of individuals in legal and non-legal settings.

Note that out of 13 arguments presented to the subjects, only 5 arguments exhibited significant differences. We hypothesize that these five arguments were perceived by the subjects as more closely related to the strengths (or weaknesses) of their cases. Then, these results might suggest that bi-directionality will be more likely to occur when the background beliefs are more closely related to the choices, in environments characterized by strategic decision-making and multiple choices. Our results are also consistent with Simon et al.'s (2004b) findings on coherence shifts in background beliefs. They found that the changes in background beliefs were less consistent and weaker than the changes in the evaluation of the facts. These findings might be explained by the nature of background beliefs. In contrast to pieces of evidence that are specific to the legal case, background beliefs pertain to larger knowledge and attitudinal structures. Then, they might be more resistant to change. Hence, the assessment of shifts in background beliefs represents a stronger test for coherence-based reasoning.

Result 1: Posterior background beliefs are significantly different from prior background beliefs, for plaintiffs and defendants. Shifts in background beliefs exhibit a role-specific pattern.

Finally, note that our results about the effects of the split-award institution on shifts in background beliefs do not support Hypothesis 3. In fact, across roles, we do not observe a significant effect of split-awards on shifts in background beliefs. These findings might suggest that coherence shifts are not driven by quantitative differences in out-of-court settlement choices.

After-Role Beliefs about Firm's Negligence

[INSERT TABLE 4 HERE]

[43]See the discussion of the third argument for the plaintiffs.

Table 4 reports information regarding the effects of role and split-award institution on litigants' after-role beliefs about firm's negligence. This table includes the information on prior background beliefs about firms' negligence (first three columns) to provide a benchmark for the analysis of role-specific differences in after-role beliefs about firm's negligence. Note that the prior background beliefs about firms' negligence were elicited before the role was assigned and the information about the legal case was provided. Hence, these beliefs can be interpreted as neutral beliefs about firms' negligence.[44] As expected, given the random assignment of subjects to conditions and roles, prior background beliefs did not depend on condition or on role, i.e., there was no a significant difference across roles or conditions.[45]

The last three columns present information on after-role beliefs about firm's negligence. We defined after-role beliefs as those beliefs about the negligence of the defendant reported by the subjects after the role was assigned and the information about the case was provided (but before the subjects committed to pretrial bargaining choices.) Under both conditions, our results indicate that the plaintiff's after-role belief about firm's negligence was significantly higher than the defendant's after-role belief ($p < .01$, in both conditions). Note, however, that only the plaintiffs' shifts in beliefs followed a coherence pattern, i.e., an alignment of beliefs to the not-yet-committed choices at the pretrial bargaining stage.[46] These findings provide support to Hypothesis 2.[47]

Note that, despite statistical comparisons between prior background beliefs and after-role beliefs were not possible, the pattern of defendants' after-role beliefs did not suggest coherence shifts.[48] These results might be explained as follows. First note that, given that

[44]The information related to the plaintiff's prior background beliefs on firms' negligence included in this table is also included in Table 3.

[45]Remember that prior beliefs about firms' negligence were elicited by providing 5 possible percentage values to the subjects: 0%, 25%, 50%, 75%, and 100%. Note also that a label was assigned to each value. Then, the prior belief about firms' negligence is a qualitative variable with ordinal information. The posterior belief about firm's negligence, on the other hand, is a continuous variable. That is the reason for which statistical comparisons between prior background beliefs and after-role beliefs were not performed.

[46]Although we observed that the after-role beliefs were greater than the prior background beliefs across roles and conditions, the shift in beliefs for the case of plaintiffs was bigger than the shift in beliefs for the case of defendants. As a consequence, the after-role beliefs for the case of the plaintiffs were significantly higher than those that corresponded to the defendants, under both conditions.

[47]Because of the different way of eliciting prior background beliefs and after-role beliefs, coherence-based reasoning was not assessed by performing within-role comparisons between prior and posterior beliefs. Note that the information about prior beliefs confirmed, as expected by the random assignment of roles, that the two groups of subjects (plaintiffs and defendants) were similar. These findings, together with the significantly higher posterior beliefs of plaintiffs, indicate coherence-based reasoning shifts in plaintiffs' beliefs about firm's negligence.

[48]Remember also that, for the case of defendants, prior and posterior background beliefs about firms'

coherence shifts should respond to the choices at the pretrial bargaining stage, and given that those choices are affected by the legal environment (standard of proof for granting a court award) in which decisions are made, then we might expect that the legal environment also affects coherence shifts. In our experimental setting, court awards (punitive damages) were granted only in case of gross-negligence. Note also that, given the definition of gross-negligence provided to the subjects, it might be inferred that litigants believed that gross-negligence implied a probability of negligence much higher than 50%. Finally, note that, given that the prior background beliefs across conditions were lower than 50%, then defendants might not have the need to shift (reduce) their prior background beliefs' about firms negligence to justify low out-of-court settlement offers.[49]

Given that subjects under both roles received the same information, our results also indicate the violation of the Bayes' rule in the updating of beliefs.

Result 2: Under both split-award statutes, plaintiff's after-role beliefs about the firm's negligence are significantly higher than defendant's after-role beliefs.

Our results also suggest that split-awards do not affect litigants' after-role beliefs about firm's negligence. Finally note that, despite the overall ambiguity of the case, we observe that the subjects displayed high levels of confidence in their after-role assessment of the negligence of the defendant. In fact, the average level of confidence in their assessments was 4.16 (in a 1-5 scale, 5 representing the highest level of confidence), across roles and conditions (no significant difference between roles or conditions).[50]

Reservation Values and Aspiration

[INSERT TABLE 5 HERE]

The first part of Table 5 reports the findings regarding the effects of split-awards and role on reservation values and aspiration.

The first group of three columns of Table 5 provides information regarding the effects of split-awards and role on mean reservation values. We defined the defendant's reservation

negligence did not exhibit significant differences.

[49]This argument might also explain the non-significant difference between defendants' prior and posterior background beliefs. We thank a referee for this suggestion.

[50]These results might suggest coherence-based reasoning in the assessment of the evidence. Simon, et al. (2004b) state that, "[h]igh levels of confidence are an indicator of [coherence-based-reasoning] because they are natural consequence of the spreading apart of the subsets of evidence, with the evidence supporting the [assigned role] dominating the remainder of the evidence" (Simon et al., 2004b, p. 19; comments in brackets).

value as the maximum amount of money that the defendant would be willing to offer to the plaintiff as an out-of-court settlement, and the plaintiff's reservation value as the minimum amount that the plaintiff would be willing to accept as an out-of-court settlement.[51] As expected, we find that only the plaintiff's reservation value was influenced by the split award institution ($p = .01$, a strongly significant effect).[52] This result suggests that the formation of the plaintiff's reservation value was strongly influenced by her expected payoff at trial.[53] These results support Hypothesis 4.

In addition, under both conditions, the mean reservation value for the defendants represented no more than 61 percent of the mean value for the plaintiffs (significant differences, $p = .06$ and $p < .01$, for the split-award and no split- award conditions, respectively). These role-specific reservation values might suggest motivated reasoning.

The second group of three columns of Table 5 reports the effects of split-awards and role on litigant's aspiration. Aspiration was defined as the amount defendant (plaintiff) would like to offer (receive). Following Kray et al. (2001), we used the first offer as the indicator of litigant's aspiration.[54] Our findings suggest that split-awards significantly reduce plaintiff's aspiration.[55] These findings provide support to Hypothesis 4 for the case of plaintiffs. We also observe that aspiration is significantly influenced by the role assigned ($p < .01$, for both statutes). The effect of role on aspiration might reflect motivated reasoning.

Result 3: Split-awards significantly decrease the plaintiff's aspiration and reservation value; split-awards do not affect the defendant's aspiration or reservation value.

[51] In order to ensure that the reservation values (and not the aspirations, i.e., amount subjects would like to receive/offer) will be elicited, we asked subjects to complete the following statements: (i) I would offer to the plaintiff NO MORE THAN $ ... as an out-of-court settlement, in case of the defendants; and, (ii) I would accept from the defendant NO LESS THAN $ ... as an out-of-court settlement, in case of the plaintiffs.

[52] Note that only the plaintiff's expected payoff at trial is affected by the split-award institution.

[53] If defendants would consider not only their own expected payoffs at trial but also their partners' expected payoff at trial in the formation of their reservation values, we could observe an effect of split-awards on defendants' reservation value. This last effect did not occur in our experiment.

[54] The difference between the litigants' reservation values and first proposals clearly supports the interpretation of first proposals as indicators of aspiration: in case of the defendants, their first offers were lower than their reservation values (in both conditions); and, in case of the plaintiffs, their first demands were greater than their reservation values. Finally note that, the value of aspiration (first offer) might also reflect strategic behavior of subjects: first offers might be strategically inflated, in anticipation of further negotiation rounds.

[55] Our results also indicate that the defendant's aspiration is lower under split-awards. Given that split awards affect only the plaintiff's expected payoff at trial (but not the defendant's expected loss at trial), these results might suggest defendants' strategic behavior. The defendant took into account the reduction in the plaintiff's expected loss at trial under split-awards when forming her aspiration. Note, however that this effect is not statistically significant.

Result 4: Under both split-award statutes, the plaintiff's reservation value and aspiration are significantly greater than the defendant's values.

Note that, consistent with Babcock and Pogarsky (1999), the plaintiff's court award estimate was significantly higher than the defendant's court award estimate ($p < .01$, for both statutes).[56] Finally note that, role-specific biases in the proposals made by plaintiffs and defendants during the first three bargaining periods (defined as the difference between the plaintiff's demand and defendant's offer) were significantly reduced by the split-award institution ($p = .07$, $p = .01$, and $p = .05$, for the first, second and third bargaining periods, respectively).[57] This last result suggests that the split award statute might operate as a *debiasing through law* mechanism.

Beliefs about Fairness

The third group of three columns of Table 5 presents information regarding the effects of split-awards and role on litigants' beliefs about fairness. Beliefs about fairness were defined as the subjects' estimates of the fair amount of money for the plaintiff to receive as an out-of-court settlement. The mean plaintiff's estimate of a fair settlement under the split-award condition was 34 percent lower than the estimate under the no split-award condition ($p = .01$).[58] This result provides support to Hypothesis 5, in case of plaintiffs. This effect can be explained as follows. Beliefs about fairness are relevant in determining pretrial bargaining choices.[59] Then, following coherence-based reasoning theories, beliefs about fairness and pretrial bargaining choices should be aligned. Given that split-awards

[56]Note also that our findings do not indicate a significant effect of the split-award institution on the court award estimates. Our experimental design and findings are aligned with the empirical regularities on split-awards. Given that the award is determined by the jury, and the information about the split-award statute is supposed to be kept from the jury, the award *does not depend* on the split-award statute. In order to reduce unnecessary complexity, in our experiment, the trial award was decided by a judge (instead of a jury). However, we specified that the judge decision would be based on the same information provided to the subjects, which did not include information about the existence of two split-award institutions.

[57]Details of the statistical tests are available upon request. These results are consistent with Babcock and Pogarsky (1999) findings on the effects of caps on self-serving bias.

[58]For the case of the defendants, the mean estimate of a fair settlement under the split-award condition represented 48 percent of the mean estimate under the no split-award condition. However, the effect of split-awards is not significant.

[59]We estimated an ordinary least squares regression, with reservation value as the dependent variable, and after-role beliefs about firm's negligence and beliefs about fairness as covariates. Consistent with Babcock and Pogarsky (1999), we found that, across subjects and conditions, the beliefs about fairness significantly explain the litigants' reservation values (variable statistically significant, $p = .01$, for plaintiffs and defendants across conditions). Regression estimation is available upon request.

significantly reduced the plaintiffs' out-of-court settlement proposals (see Result 7), we might also expect that these statutes will reduce the amount considered by the plaintiff as a fair out-of-court settlement outcome. These results provide additional support to the claim that split-award statutes might operate as *debiasing through law* mechanisms.

Result 5: Split-awards significantly reduce the plaintiff's amount considered a fair out-of-court settlement outcome.

Our findings also suggest that the beliefs about fairness are affected by the role assigned, under both conditions.[60] In fact, the plaintiffs' estimates were more than 150 percent higher than the defendants estimates ($p < .01$, under both split-award conditions).[61]

Result 6: Under both split-award statutes, the plaintiff's amount considered a fair out-of-court settlement outcome is significantly higher than the defendant's amount.

Bargaining Outcomes

[INSERT TABLE 6 HERE]

Table 6 reports the effects of split-awards on bargaining outcomes. Our findings are consistent with Landeo et al. (2007a). As expected, the mean out-of-court settlement under the split-award condition was lower than the mean out-of-court settlement under the no split-award condition (a significant difference, $p < .01$). This result might suggest that plaintiffs and defendants formulated their out-of-court settlement proposals by considering the lower expected award at trial under the split award condition. Hence, subjects exhibited strategic behavior. We also analyzed the defendant's total litigation loss, defined as the accepted proposal that is transferred from the defendant to the plaintiff (in case of an out-of-court settlement), or as the deduction from the defendant's payoff imposed by the court plus the defendant's litigation costs (in case of trial). Our findings suggest a positive and significant effect of the split-award in reducing the defendant's total litigation loss ($p = .02$). This effect can be explained by the higher probability of out-of-court settlement and the lower mean out-of-court settlement amounts under the split-award institution. Our findings regarding the plaintiff's net compensation (net of litigation cost) suggest that split-awards reduced

[60]Konow (2005) studies the effects of information and stakes on fairness bias and dispersion. His analysis suggests that, although information is often used in a self-serving way, increased information can, under certain conditions, contribute to fairness claims becoming less biased and less dispersed.

[61]Note that, across conditions and subjects, the values of the estimates of a fair out-of-court settlement outcome were located between the reported reservation values and the first proposals (aspirations).

significantly the plaintiff's net compensation ($p < .01$). This result is related to the lower mean out-of-court transfers, and the lower plaintiff's payoff at trial under the split-award institution.

Result 7: Split-awards significantly decrease the out-of-court settlement amount, the plaintiff's net compensation, and the defendant's litigation loss.

5 Conclusions

Our paper experimentally studies the effects of the split-award tort reform on litigants' beliefs and bargaining outcomes. In addition, we study the formation of litigants' beliefs in a strategic environment (i.e., within a pretrial bargaining game between a plaintiff and a defendant and a continuum of possible out-of-court settlement choices). This study reports several interesting results. First, our findings on belief formation suggest the presence of coherence-based reasoning. We observe coherence shifts in litigants' background beliefs toward supporting their choices at the pretrial bargaining stage, i.e., *a bi-directional relationship between choices and background beliefs.* Second, we find that role-specific bias operates in the updating of plaintiffs' after-role beliefs about the defendant's negligence *prior to the commitment to a choice* at the pretrial bargaining stage. This finding provides additional support to coherence-based reasoning theories. It also indicates a violation of Bayes' rule. Third, role-specific shifts in the plaintiffs' beliefs about fairness are observed. Fourth, our findings provide evidence on the effects of split-awards on plaintiffs' beliefs and bargaining outcomes. We observe that the split-award institution affects plaintiffs' beliefs about fairness. We also find that out-of-court settlement amounts are significantly lower when bargaining is performed under the split-award statute.

This study shares a weakness in terms of external validity that is common to all laboratory experimental research. Although our experiment cannot predict the effects of the split-award institution and role on settlement in richer environments, this experiment provides evidence regarding whether the addition of the split-award institution into the bargaining process we have structured here will have the predicted effects.

Our findings regarding the effects of split-awards on plaintiffs' beliefs about fairness suggest that this tort reform might operate as a *debiasing through law* mechanism. Hence, split-awards might contribute to improve efficiency in *current* decision-making processes. The observed reduction in biases on litigants' offers at the pretrial bargaining stage under split-awards provides additional support to this claim. Our results regarding the coherence shifts in litigants' background beliefs suggest that legal processes (pretrial bargaining negotiations)

might operate as a *biasing through law* mechanisms. It can be argued that if recurring coherence shifts leave a strong imprint, then, repeated shifts in beliefs might operate as a form of learning (Simon, 2004). Hence, participation in legal processes might distort *future* choices of individuals in legal and non-legal settings. Policy-makers should be aware of the potential positive effect of the split-award tort reform, and more generally, consider the unintended negative consequences of legal processes.

It might be interesting to experimentally assess the factors that affect the level of endurance of the coherence shifts in beliefs in strategic settings.[62] These, and other extensions, may be fruitful topics for future research.

[62]Simon et al. (2008) reports some findings on the duration of coherence shifts regarding job choices, conducted at *an individual decision-making level*. His experimental evidence suggests that coherence shifts can be transitory. However, he states that "a limitation of [these] studies is that *[they] did not test decisions that involve material stakes* for the participants" (p. 12; emphasis added). Note also that these environments did not involve strategic settings.

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Table 1: Qualitative Hypotheses and Extensions to Previous Studies

QUALITATIVE HYPOTHESES	
	Coherence-Based-Reasoning (Posteriors - Priors)
1) Plaintiff's Background Beliefs that Strengthen the Plaintiff's Case	> 0
2) Defendant's Background Beliefs that Strengthen the Defendant's Case	> 0
	Role of Plaintiff (Self-Serving-Bias)
After-Role Belief about Firm's Negligence	+
	Split-Award Institution
1) Plaintiff's Belief about a Fair Settlement	-
2) Defendant's Belief about a Fair Settlement	-
3) Plaintiff's Reservation Value	-
4) Defendant's Reservation Value	no effect
5) Plaintiff's Aspiration	-
6) Defendant's Aspiration	-
7) Plaintiff's Shifts in Posterior Background Beliefs that Strengthen the Plaintiff's Case	-
8) Defendant's Shifts in Posterior Background Beliefs that Strengthen the Defendant's Case	-

EXTENSIONS TO PREVIOUS STUDIES	
	Role of Plaintiff (Self-Serving Bias)
1) Estimated Court Award	+
2) Belief about a Fair Settlement	+
	Split-Award Institution
1) Settlement Amount	-
2) Settlement Rate	+
3) Defendant's Total Losses	-
4) Plaintiff's Net Compensation	-

Note: The belief about a fair settlement corresponds to the litigant's belief about the fair amount for an out-of-court settlement; positive and negative effects are represented by the + and − signs, respectively.

Table 2: Summary of Questions about Background Beliefs

	Position Strengthened if Value Increase
(Q1/QC) Firms' Concerns About Safety	D
(Q2/QH) Unreliability of Defendants' (People) Testimonies	P
(Q3/QF) Ambiguity of the Legal Case Exploited by Defendants (Firms)	P
(Q4/QM) Religious People's Concerns about Safety of Others	D
(Q5/QJ) Firms' Good Quality of Service	D
(Q6/QL) Negligence of Firms Involved in Product Liability Lawsuits	P
(Q7/QA) Consultants' Good Quality of Service	D
(Q8/QD) Unreliability of Defendants' (Business Owners) Testimonies	P
(Q9/QB) Companies Exploited in Court by Plaintiffs (People)	D
(Q10/QI) Unreliability of Public Officers' Testimonies in Favor of People They Like	P
(Q11/QG) Fairness on Court Decisions in Product Liability Cases	N
(Q12/QK) Unreliability of Witnesses' Testimonies Against People They Don't Like	P
(Q13/QE) Inflated Lawsuit Claims	D

Note: Qi/Qj indicate the labels used for the questions regarding prior and posterior background beliefs, respectively (both questions are identical, but the order and labels used are different); P, D, and N stand for Plaintiff, Defendant, and Neutral, respectively. See Appendices for detail about the questions.

Table 3: Mean Prior and Posterior Background Beliefs

	Split-Award			No Split-Award			p-value$^{(a)}$
	Prior	Posterior	p-value	Prior	Posterior	p-value	
Plaintiff							
Negligence of Firms Involved in Product Liability Lawsuits	.44 (.05) [$n = 24$]	.54 (.04) [$n = 24$]	.03	.45 (.04) [$n = 29$]	.50 (.04) [$n = 29$]	.29	.58
Religious People's Concerns about Safety of Others	.60 (.04) [$n = 24$]	.47 (.04) [$n = 24$]	.01	.51 (.05) [$n = 29$]	.41 (.05) [$n = 29$]	.02	.56
Unreliability of Witnesses' Testimonies Against People They Don't Like	.35 (.04) [$n = 24$]	.40 (.04) [$n = 24$]	.33	.36 (.04) [$n = 29$]	.46 (.04) [$n = 29$]	.01	.38
Defendant							
Inflated Lawsuit Claims	.58 (.05) [$n = 24$]	.69 (.04) [$n = 24$]	.09	.55 (.05) [$n = 29$]	.67 (.04) [$n = 29$]	.03	.74
Unreliability of Public Officers' Testimonies in Favor of People They Like	.54 (.05) [$n = 24$]	.41 (.05) [$n = 24$]	.02	.47 (.05) [$n = 29$]	.44 (.05) [$n = 29$]	.45	.23
Unreliability of Witnesses' Testimonies Against People They Don't Like	.36 (.05) [$n = 24$]	.38 (.03) [$n = 24$]	.37	.36 (.04) [$n = 29$]	.41 (.04) [$n = 29$]	.07	.70

Note: $^{(a)}$ last column refers to the effect of the split-award institution on shifts in background beliefs (posterior minus prior background beliefs), p-values correspond to the Wilcoxon-Mann-Whitney statistic test; standard errors are in parentheses; sample sizes are in brackets; p-values for the third and sixth columns correspond to the Wilcoxon Matched-Pairs Signed-Ranks statistic test.

Table 4: Mean Prior Background Beliefs and After-Role Beliefs about Firm's Negligence

	Prior Background Beliefs			After-Role Beliefs		
	Split-Award	No Split-Award	p-value	Split-Award	No Split-Award	p-vlaue
Plaintiff	.44	.45	.83	.81	.82	.81
	(.05)	(.04)		(.04)	(.03)	
	$[n = 24]$	$[n = 29]$		$[n = 24]$	$[n = 29]$	
Defendant	.45	.47	.84	.48	.55	.36
	(.05)	(.04)		(.07)	(.05)	
	$[n = 24]$	$[n = 29]$		$[n = 24]$	$[n = 29]$	
p	.87	.84		.00	.00	

Note: Standard errors are in parentheses; sample sizes are in brackets; p-values correspond to the Wilcoxon-Mann-Whitney statistic test.

Table 5: Mean Reservation Value, Aspiration, and Fair Settlement Belief
(In Thousands of Dollars)

	Reservation Value			Aspiration			Fair Settlement Belief		
	Split	No Split	p	Split	No Split	p	Split	No Split	p
Plaintiff	328	497	.01	490	713	.01	402	605	.01
	(52)	(45)		(60)	(39)		(55)	(53)	
	[$n = 24$]	[$n = 29$]		[$n = 24$]	[$n = 29$]		[n = 24]	[n = 29]	
Defendant	199	278	.45	87	151	.19	109	227	.13
	(34)	(44)		(14)	(29)		(18)	(42)	
	[$n = 24$]	[$n = 29$]		[$n = 24$]	[$n = 29$]		[n = 24]	[n = 29]	
p-value	.06	.00		.00	.00		.00	.00	

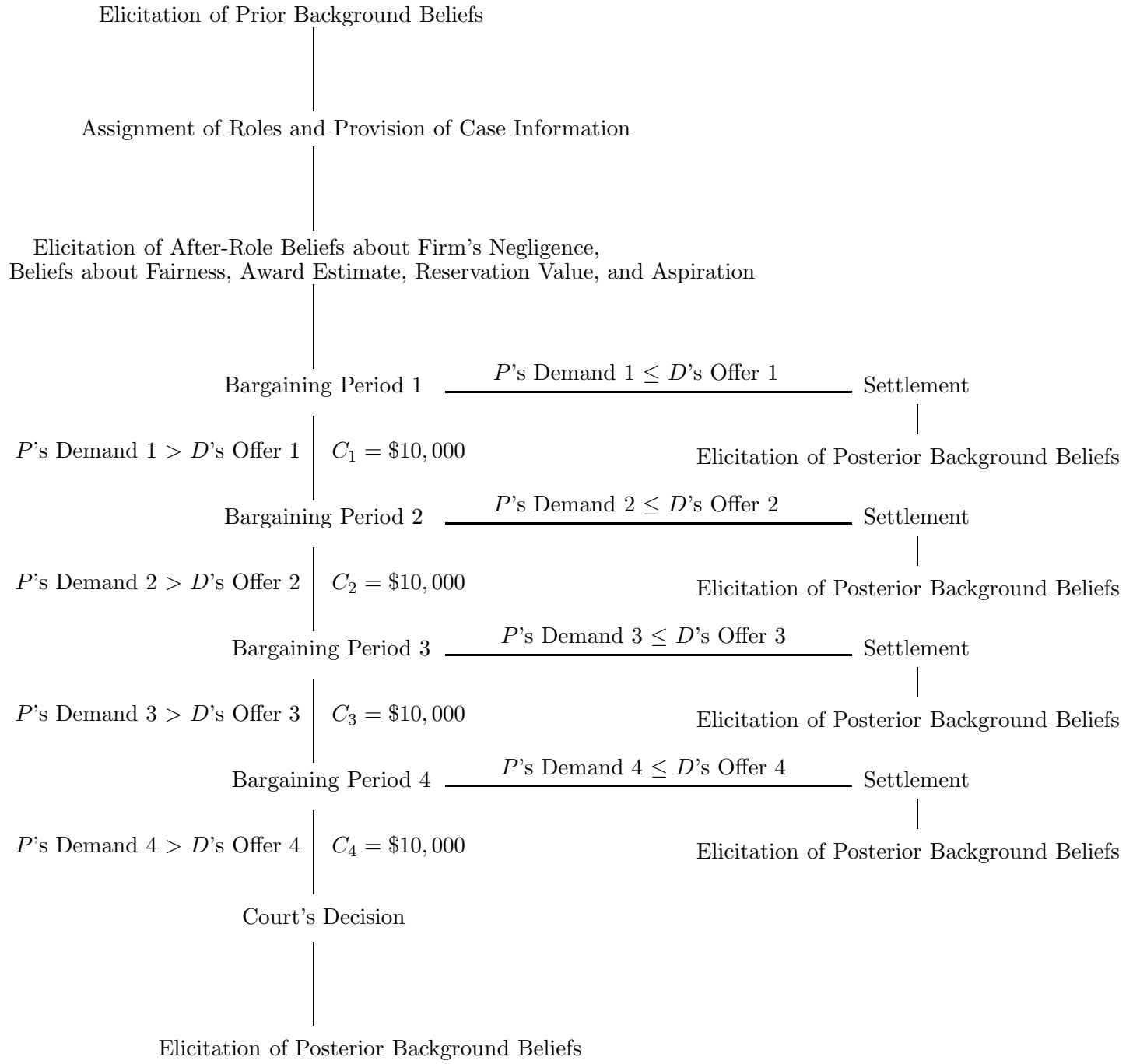
Note: Standard errors are in parentheses; sample sizes are in brackets; p-value corresponds to the Wilcoxon-Mann-Whitney statistic test.

Table 6: Bargaining Outcomes

	Split-Award	No Split-Award	p-value
Mean Settlement Amount	209,930.6	442,352.8	.00
(pairs that settled out-of-court)	(32,440.31)	(30,172.21)	
Settlement Rate	.75	.59	.21
Mean Plaintiff's Net Compensation	178,830.5	464,334.1	.00
	(25,893.17)	(33,019.96)	
Mean Defendant's Total Loss	361,812.5	518,816.9	.01
	(61,093.97)	(34,421.14)	
Number of Pairs that Settled Out-of-Court	18	17	
Total Number of pairs	24	29	

Note: Amounts are expressed in dollar terms; standard errors are in parentheses; p-values correspond to the Wilcoxon-Mann-Whitney statistic test.

FIGURE 1
SEQUENCE OF EVENTS IN THE EXPERIMENT



Note: C_i = cost of disagreement in period i, $i = 1, 2, 3, 4$.